Disk storage container

FIELD OF THE INVENTION

The invention relates to a disk storage container for at least one readable and/or writable data disk having a ferro-magnetic hub in its centre.

BACKGROUND OF THE INVENTION

Disks having a ferro-magnetic hub in their centre are for example blue laser based optical disks. These disks are commonly accommodated in a cartridge in order to protect the disk from damages. However, recent developments in protective coatings for such disks have made it possible to obtain a very good resistance against scratching and against fingerprints. It is anticipated therefore that a cartridge will become obsolete and bare disks will be used.

There are other developments in the standardisation of disks to create a disk having a diameter of about 50 mm which could be used without a cartridge. Such disks are sufficiently strong to be used without a cartridge.

One possible option of storing such bare disks in a disk storage container is to have a container comprising several open sleeves to accommodate the disk and to cover it at least partly. One example of such disk storage container is disclosed in JP-A-2003-237869. Inserting a disk into a sleeve and taking it out again is however not very convenient.

An object of the present invention is to provide a disk storage container providing easy access and removal of a disk from its storage position.

SUMMARY OF THE INVENTION

For this purpose the invention provides a storage container for at least one readable and/or writable data disk having a ferro-magnetic hub in its centre, said container comprising at least one surface for accommodating the disk, said surface including a magnetic member in a position to enable alignment of the disk hub for holding said disk adjacent said surface.

Due to the magnetic attraction of the surface, it is only necessary to position the disk on the surface for storing it and to grab it for taking it out again from its storage

position in the container. This is very user friendly. The magnetic force with which the disk is attracted to the surface can be controlled by design and can be made large enough to hold the disk in a reliable manner, and small enough to be able to remove the disk without exerting forces on the disk which may cause deformation of the disk which would place too large a burden on the coatings and cause deterioration of the media.

Due to the guiding means according to claim 2 it is very easy to bring the ferro-magnetic hub of the disk in alignment with the magnetic material on the surface. In case the guiding means includes a centring member according to claim 3 it is facilitated that always the same position of the disk is obtained.

According to claims 4 and 5 the centring member may be formed by a circumferential wall on the surface which may be interrupted in order to gain access to the circumference of the disk. This enables removal of the disk by gripping it at its edge.

The embodiment of claim 6 has the advantage that the disk will not contact the surface when it is in its stored position on the magnet which protrudes at least partly above the surface. This reduces the risk of damage to the disk.

A very space saving structure is obtained in the embodiment of claim 7, especially if the substantially flat panel has a disk storing surface on both sides.

One conceivable embodiment of the storage container is claimed in the claim 9. This storage container enables a user to carry around a number of disks, which is especially convenient when the disks are used for mobile applications in which the user also carries around the device including a disk drive, such as a mobile phone, a disk player, a PDA or the like.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be explained in more detail with reference to the drawing, in which

Figure 1 shows an exemplary embodiment of the disk storage container according to the invention in a schematic perspective view and

Figures 2 to 4 schematically show alternative embodiments.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 shows the disk storage container as well as a disk D, which may be an audio, video or data disk, in particular an optical disk. The disk may have any dimensions, but the invention is particularly, but no exclusively, suited for disks having smaller diameters,

for example smaller than 50 mm. The optical disk D has a central hub H made of ferro-magnetic material. The disk drives in which the disk D is used comprises a magnetic spindle to clamp the disk in the disk drive. Around the hub H there is a space for data. Data may be read or written from/on one or both sides of the disk D.

In this embodiment, the storage container comprises a plurality of panels 1 comprising at least one surface 2 for holding the disk D. This surface 2 may be provided on one side of the panel 1, but it is very well conceivable that the panel 1 has a surface 2 on both sides. The surface 2 may be recessed in the panel 1 in order to create a circumferential wall 3 which acts as guiding and/or centring means for the disk in order to facilitate correct position of the disk D. In the centre of the surface 2 there is provided magnetic material 4 in the form of a magnet attached to the surface 2 or magnetic material (like a magnetic polymer composite) provided on or integrated in the panel 1. The magnetic material 4 may be provided in an area which is substantially as large as the hub H of the disk D, but for any reason the magnetic material may be present in a smaller or larger area as long as the disk hub H is allowed to be aligned therewith.

The magnetic material 4 may have an upper surface which is flush with the surface 2, but may also be positioned at a lower level or may protrude from the surface 2. In the lower level embodiment, there will be no direct contact between the hub H and the magnetic material 4 which decreases the attractive force on the hub H. This leads to very low forces for removing the disk D. In the latter embodiment, the magnetic material 4 may protrude from the surface 2 thereby creating a support for the disk D which will then be free from the surface 2. In all cases, the disk D will be adjacent to the surface 2 in its stored position.

The circumferential wall 3 may be interrupted in order to create gripping areas allowing the disk D to be gripped by the fingers in order to be removed. The interruptions in the circumferential wall 3 may be small and just sufficient to grip the disk D, but may also be large so that very small wall portions are present. These wall portions may be so small that they result in pins or cams on the surface 2 of the panel 1, which are distributed around the magnetic material 4. In the stored position, the disk D may rest against or on the centring/guiding means or may stay clear from it by a small play.

In the embodiment shown the panels 1 are pivotally connected to each other so that the panels 1 may be pivoted around a common axis in order to be able to leave through the panels. Of course other arrangements are conceivable. For example, the panels 1 may be connected in a zigzag configuration. In these embodiments, one panel 1 will form a cover for

the other panels. The outer panels, as seen in the closed position of the container, may have an outer surface which does not hold a disk D, so that all stored disks are within the container and thereby protected by the container.

Figs. 2 – 4 show some alternative embodiments of the container according to the invention. In Fig. 2 the panel 1 comprises four surfaces 2, each intended to hold a disk D. In Fig. 3, the surface 2 is defined between pins, cams or other projections 5 around the surface acting as guiding and centring means in order to guide a disk D to the surface 2 so as to enable its hub H to become aligned with the magnetic material 4. The magnetic material 4 has a rectangular shape in this case. Fig. 4 shows a revolver type container wherein a circular panel 1 comprises a plurality of surfaces 2 distributed around the central axis of the panel. The panel 1 may be accommodated (rotatably) in a housing (not shown) having one or more openings to allow a disk D to be positioned onto or removed from one of the surfaces 2.

From the foregoing it will be clear that the invention provides a disk storage container which is very easy to use and which offers maximum protection to the disks.

The invention is not restricted to the above-described embodiment as shown in the drawing, which can be varied in several ways without departing from the scope of the invention. As shown, it is possible, for example, that a panel of the storage container is large enough to comprise several surfaces thereon to hold several disks. In that case, it has magnetic material provided such that the disks are held in different positions on the panel. Centring means may guide the disk to its respective position on the panel.

It is noted that in specification and claims, the use of the expressions "a" or "an" does not exclude a plurality thereof, whereas the expression "comprising" does no exclude additional elements or steps. Reference signs in the claims shall not be construed as limiting the scope thereof.

In the presently preferred embodiments, the disk is an optical data disk. However, it should be understood that the invention can also be used for all kinds of other disks.